

**REMARKS**

This Amendment amends dependent claims 2 and 29 in accordance with the Examiner's helpful suggestion. From page 5, lines 3-8, one of ordinary skill in the art would understand the liquid phase of the fibre suspension is disintegrated as small liquid drops whose diameter is predominantly  $< 10$  mm. Claims 1-15 and 27-39 are pending.

Entry of this Amendment is earnestly requested, as it is believed (1) to place the application in condition for allowance, (2) not to raise any new issue or require further search, (3) to be directly responsive to the Official Action, and (4) to place the application in even better form for appeal, should such appeal be necessary. More particularly, the amendment of claim 2 (and corresponding change to claim 29) overcomes the indefiniteness rejection discussed below.

This Amendment overcomes the 35 U.S.C. § 112, second paragraph, rejection of claim 2, which has been amended to specify the small liquid drops have a diameter which is predominantly  $< 10$  mm. A corresponding change has been made to claim 29. Reconsideration and withdrawal of the indefiniteness rejection of claim 2 are respectfully requested.

The 35 U.S.C. § 103(a) rejection of claims 1-4, 8-15, 27-30 and 34-39 over U.S. Patent No. 5,223,090 to Klungness et al. in view of U.S. Patent No. 6,416,727 to Virtanen et al. is traversed. A feature of the claimed method is the fibre material is activated in an activation zone prior to and/or during precipitation, thereby increasing the ability of the fibres to bind with one another and to bind to precipitated mineral substances. Another feature of the claimed method is that dwell time of the fibre material in the activation zone is less than 10 seconds. A third feature of the claimed method is that the fiber suspension is fed into the gas space as small drops, which ensures a large contact area between the fibrous material, the reactive mineral substance and the gas containing the precipitating reactant (e.g., carbon dioxide).

There are significant differences between the claimed method and the method disclosed by Klungness et al. First, Klungness et al. fails to disclose activating its fiber material in an activation zone prior to or during precipitation of the precipitated mineral substance. Instead, Klungness et al. teaches first mixing pulp with calcium oxide or calcium hydroxide in a mixer (Col. 8, lines 35-40). Then this material is brought into contact with carbon dioxide under pressurized conditions for 15

minutes. After the formation of calcium carbonate, the pulp is "refined" to facilitate contact between the fibres and the calcium carbonate. See Col. 8, lines 41-51:

"The high consistency pulp was then loaded into the hopper of the refiner which was closed and sealed. Carbon dioxide was injected into the hopper to react with the calcium hydroxide. Carbon dioxide was held in the tank at 20 lbs. pressure for 15 minutes. During this interval, calcium carbonate was precipitated in the pulp fibers by the reaction of calcium oxide or calcium hydroxide with the carbon dioxide. The pulp is then refined in a carbon dioxide atmosphere at the desired plate gap and feed rate to provide intimate contact of the carbonate and fibers".

(Emphasis added). In contrast, the claimed method activates the fibres prior to and/or during formation of calcium carbonate. This difference in sequence is critical. The claimed method produces a very high loading of fillers because the fibres have been fibrillated before and/or during formation of the filler (calcium carbonate). Furthermore, this step will produce a strong bonding between the fibres and a strong bonding between the fibres and the fillers.

Second, Klungness et al. also fails to disclose a fiber activation step of less than 10 seconds. Contrary to the assertions in the Official Action, the Klungness et al. Abstract does not disclose a fiber activation step of less than one second.

Third, the claimed method feeds the fibre suspension into the gas space as small drops or particles, which ensures a large contact area between the fibrous material, the reactive mineral substance and the gas containing the precipitating reactant (e.g. carbon dioxide). As recognized by the Patent Office, this feature of the claimed method is nowhere disclosed in Klungness et al.

Fourth, Klugness et al. fails to disclose creating a gas space containing a precipitant within the precipitation reactor, much less disintegrating a fibre suspension within the gas space.

Moreover, modification of the Klungness et al. method is not a "simple substitution" of one known method for another. Instead, the two methods produce different products and are not equivalent. The Klungness et al. method is directed to a method for loading a chemical compound within the fibers of a fibrous material (Abstract). In contrast, the Virtanen method prepares precipitated calcium carbonate per se rather than paper containing calcium carbonate filler. Virtanen is not at all concerned with loading of this filler onto fibers, particularly not *in situ* loading of high amounts of these fillers into the fiber material.

One of ordinary skill in the art, seeking to improve *in situ* loading of high amounts of fillers such as  $\text{CaCO}_3$  into fibrous substrates such as paper, would not be led to the claimed method

from a patent directed to the production of  $\text{CaCO}_3$ . Reconsideration and withdrawal of the obviousness rejection of claims 1-4, 8-15, 27-30 and 34-39 over Klungness et al. in view of Virtanen are requested.

The 35 U.S.C. § 103(a) rejection of claims 5-7 and 31-33 over Klungness et al. in view of Virtanen is also traversed. These claims all depend, ultimately, from claim 1. Accordingly, the dependent claims are also patentable over the cited references for at least the reasons discussed above.

The Official Action mentions "another reference by Virtanen ("hereinafter referred to as '454")" in paragraph 29 on page 8. This 454 reference is believed to be WO 96/18454 to Virtanen, which discloses the use of a plurality of pin mills to produce high solids content slurries.

Virtanen '454 does not remedy the deficiencies of Klungness et al. and Virtanen, discussed above. Virtanen '454 does not disclose or suggest *in situ* loading of high amounts of fillers into fiber material. Reconsideration and withdrawal of the obviousness rejection of claims 5-7 and 31-33 are requested.

It is believed this application is in condition for allowance. Reconsideration and withdrawal of all rejections of claims 1-15 and 27-39, and issuance of a Notice of Allowance directed to those

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AMENDMENT AFTER FINAL REJECTION

**PATENT**

claims, are earnestly requested. The Examiner is urged to telephone the undersigned should he believe any further action is required for allowance.

It is not believed any fee is required for entry of this Amendment. Nevertheless, the Commissioner is authorized to charge Deposit Account No. 50-1258 in the amount of any such required fee.

Respectfully submitted,

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